Is enucleation safe for pancreatic neuroendocrine tumors?  
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Background

- Pancreatic neuroendocrine tumors (PNETs) are rare, comprising 1.3% of pancreatic neoplasms.
- Prognosis depends on tumor size, nodal involvement, metastases, and tumor grade.
- Guidelines include observation of non-functional PNETs <1cm; surgical resection is recommended larger PNETs.
- Increased incidence of small PNETs, often incidentally, due to increased utilization of cross-sectional imaging.

Methods

- We used the National Cancer Database (NCDB) Pancreas Participant User File from 2004 - 2016.
- We included patients with undergone curative-intent pancreatic resection for PNET.
- We excluded patients with tumors >2cm in size.
- We identified if resection involved oncologic resection, defined as resection of the primary tumor with regional lymph nodes, or involved simple enucleation without node resection.
- Fisher’s exact test and log-rank test were used to identify statistical differences when applicable. Logistic regression was used to evaluate predictors of nodal upstaging.

Results

- The cohort derivation is illustrated in Figure 1. Patient characteristics of those who underwent oncologic resection vs enucleation are demonstrated in Table 1.
- In patients who underwent oncologic resection, rate of node positivity was 16.1% (Grade 1 PNETs 13.2%; Grade 2 PNETs 24.5%; Grade 3 PNETs 62.5% ).
- Of patients who underwent oncologic resection, 5-year overall survival rate was 82.1% in patients found to have node positive disease vs. 89.7% in patients found to be node-negative (p<0.001; Figure 2).
- In 2,865 patients clinically staged as having node negative disease prior to resection, 74.3% underwent oncologic resection. Of these patients, 18.8% were found to have node-positive disease after resection (Figure 3).
- Larger tumor size and higher tumor grade are independent predictors of nodal upstaging (Table 2).

Conclusions

- Enucleation should be performed with caution on small PNETs.
- Nearly one sixth of patients with PNETs <2cm who underwent oncologic resection had node positive disease on final pathology.
- Roughly one in five patients with PNETs <2cm who underwent oncologic resection for clinically node negative disease were found to have node positive disease on final pathology.
- There is no significant difference in 5-year overall survival rate between patients who underwent formal oncologic resection found to have node-negative disease and patients who underwent tumor enucleation.
- Clinical staging is not always reliable. Patients who undergo enucleation may benefit from closer surveillance strategies.